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Notes:

1. Untranslatable words are replaced with asterisks (* **).
2. Texts in the figures are not translated and shown as it is.

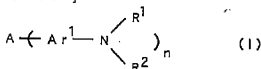
Translated: 03:59:43 JST 05/30/2008

Dictionary: Last updated 04/11/2008 / Priority: 1. Chemistry / 2. Electronic engineering / 3. Mathematics/Physics

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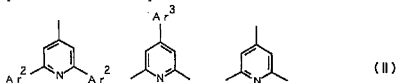
[Claim(s)]

[Claim 1] The amino compound expressed with a following general formula (I) : [Chemical formula 1]



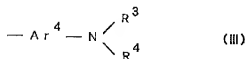
(A expresses among a formula the group expressed with a following general formula (II), and it is;.)

[Chemical formula 2]



(Ar2 and Ar3 express the aryl group which is not replaced [displacement or]); --; to which Ar1 expresses the arylene machine which is not replaced [displacement or] -- [R1 and R2 to which n expresses the integer of 1, 2, or 3 / independently], respectively The aromatic heterocycle machine which is not replaced [the aryl group which is not replaced / an alkyl group, an aralkyl machine, displacement, or /, displacement, or] is expressed. When two or more Ar1 combine with; A which R1 and R2 are united and may form a ring, even if the portion to Ar1, R1, and R2 is the same and they differ, it is not cared about.

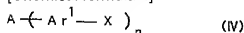
[Claim 2] The amino compound according to claim 1 which is the group as which R1, R2, or both are expressed in a following general formula (III) in the above-mentioned general formula (I) : [Chemical formula 3]



(;R3 and R4 to which Ar4 express the arylene machine which is not replaced [displacement or] express independently among a formula the aromatic heterocycle machine which is not replaced [the aryl group which is not replaced / an alkyl group, an aralkyl machine, displacement, or /, displacement, or], respectively, and R3 and R4 are united and they may form a ring) .

[Claim 3] Halogenated compound expressed with a following general formula (IV);

[Chemical formula 4]

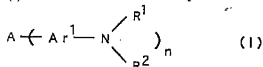


It is the amino compound expressed with a following general formula (V) (an invention described in Claim 1 and this meaning;X express a halogen atom among a formula, as for A, Ar1, and n).;

[Chemical formula 5]



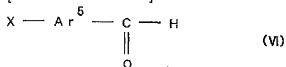
(-- [R1 and R2 / the amino compound which is characterized by making a thing according to claim 1 or 2 and this meaning) react and which is expressed with a following general formula (I) / manufacture method:[Chemical formula 6]] among a formula



(The inside of a formula, A, Ar1, n, R1, and R2 are the above and this meaning) .

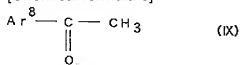
[Claim 4] (a) Formylation aryl compound expressed with a following general formula (VI);

[Chemical formula 7]



It is the acetylation aryl compound expressed with a following general formula (IX) (Ar5 express among a formula the arylene machine which is not replaced [displacement or], and X expresses a halogen atom).;

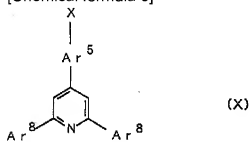
[Chemical formula 8]



It is the process which it makes it react (Ar⁸ express among a formula the aryl group which is not replaced [displacement or]), and obtains pyrylium salt;

(b) The halogenation 2 and 4 which heat-treats said pyrylium salt in the aqueous solution of ammonia or an ammonia salt, and is expressed with a following general formula (X), 6 thoria reel pyridine compound;

[Chemical formula 9]

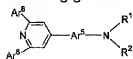


(-- said halogenation 2 and 4 (c) c [process; which makes Ar⁵ and Ar⁸ convert into the above and this meaning) among a formula, and] obtained, and amino compound; expressed with 6 thoria reel pyridine compound and a following general formula (V)

[Chemical formula 10]



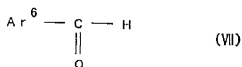
The manufacture method of an amino compound which consists of the process to which <EMI ID=000012 HE=025 WI=053 LX=0335 LY=1000> (the inside of a formula, R¹, and R² are a thing according to claim 1 or 2 and this meaning) is made to react of being expressed with a following general formula : [Chemical formula 11]



(The inside of a formula, Ar⁵, Ar⁸, R¹, and R² are the above and this meaning) .

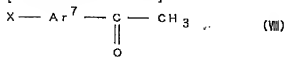
[Claim 5] (a) Formylation aryl compound expressed with a following general formula (VII);

[Chemical formula 12]



It is the acetylation aryl compound expressed with a following general formula (VIII) (Ar⁶ express among a formula the aryl group which is not replaced [displacement or]);

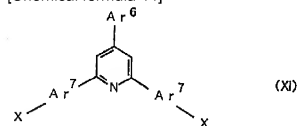
[Chemical formula 13]



It is the process which it makes it react (Ar⁷ express among a formula the arylene machine which is not replaced [displacement or], and X expresses a halogen atom), and obtains pyrylium salt;

(b) The halogenation 2 and 4 which heat-treats said pyrylium salt in ammonia or the aqueous solution of ammonium salt, and is expressed with a following general formula (XI), 6 thoria reel pyridine compound;

[Chemical formula 14]

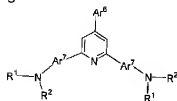


(-- said halogenation 2 and 4 (c) c [process; which makes Ar⁶ and Ar⁷ convert into the above and consent matter) among a formula, and] obtained, and amino compound; expressed with 6 thoria reel pyridine compound and a following general formula (V)

[Chemical formula 15]



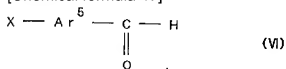
(-- [R¹ and R² / the amino compound which consists of the process to which a thing according to claim 1 or 2 and this meaning) are made to react and which is expressed with a following general formula / manufacture method:[Chemical formula 16]] among a formula



(The inside of a formula, Ar₆, Ar₇, R₁, and R₂ are the above and this meaning) .

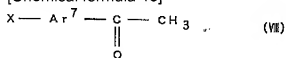
[Claim 6] (a) Formylation aryl compound expressed with a following general formula (VI);

[Chemical formula 17]



It is the acetylation aryl compound expressed with a following general formula (VIII) (Ar₅ express among a formula the arylene machine which is not replaced [displacement or], and X expresses a halogen atom).;

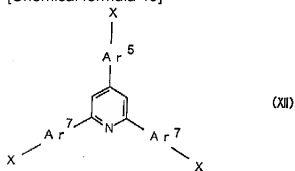
[Chemical formula 18]



It is the process which it makes it react (Ar₇ express among a formula the arylene machine which is not replaced [displacement or], and X expresses a halogen atom), and obtains pyrylium salt.;

(b) The halogenation 2 and 4 which heat-treats said pyrylium salt in ammonia or the aqueous solution of ammonium salt, and is expressed with a following general formula (XII), 6 thoria reel pyridine compound;

[Chemical formula 19]



(c) c [process; made to convert (for Ar₅ and Ar₇ to express among a formula the arylene machine which is not replaced / displacement or /), and] They are said obtained halogenation 2 and 4 and the amino compound expressed with 6 thoria reel pyridine compound and a following general formula (V).;

[Chemical formula 20]



(-- [R1 and R2 / the amino compound which consists of the process to which this above-mentioned Claim 1 or invention described in Claim 2, and meaning) is made to react and which is expressed with a following general formula / manufacture method:[Chemical formula 21]] among a formula

(The inside of a formula, Ar5, Ar7, R1, and R2 are the above and this meaning) .

[Claim 7] The hole transporting material which consists of an amino compound according to claim 1.

[Claim 8] The organic electroluminescence element further characterized by being a layer containing an amino compound according to claim 1 at least in the organic electroluminescence element equipped with two or more organic compound films which contain a luminous layer or a luminous layer in inter-electrode [of a pair].

[Claim 9] The electrophotography photo conductor characterized by a charge transporting material being a hole transporting material according to claim 7 in the electrophotography photo conductor which uses a charge generating material and a charge transporting material on a conductive substrate.

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to a new amino compound and its new manufacture method, and its use. The amino compound of this invention can be used for a luminescent material, an organic photoconduction material, etc., and, more specifically, is useful to the organic electroluminescence element and electrophotography photo conductor which are used for a surface light source or labeling.

[0002]

[Description of the Prior Art] An organic photoconductivity material currently developed as a photo conductor or a charge transporting material has low cost and various workability, there are many advantages, such as nonpolluting, and many compounds are proposed.

[0003] For example, organic photoconduction material, such as an oxadiazole compound, a hydrazone compound, a pyrazoline compound, an oxazole compound, an arylamine compound, a benzidine compound, a stilbene compound, and a butadiene compound, is proposed.

[0004] An electrophotography photo conductor is mentioned as one of the technology using a

charge transporting material. An electrophotographing system is one of the image formation methods invented by Carlsson. This method consists of carrying out image exposure, making an electrostatic latent image form on a photo conductor, making toner adhere on this electrostatic latent image, developing negatives, and transferring the obtained toner image on paper, after being charged in a photo conductor by a corona.

[0005] That suitable electric potential is held in a dark place as fundamental characteristics required of the photo conductor in such an electrophotographing system, that there is little loss of the charge in a dark place, dissipating a charge promptly by optical exposure, etc. are mentioned. As for the conventional electrophotography photo conductor, inorganic photoconductors, such as selenium, a selenium alloy, zinc oxide, and cadmium sulfide, have been used. Although it has an advantage, like these inorganic matter photoconductor has high endurance, and there are many *-proof sheets, problems, such as that it is inferior to workability with high manufacture cost and having toxicity, are pointed out.

[0006] [in order to conquer these faults, development of an organic photo conductor is performed, but] As for the electrophotography photo conductor which used the organic photo conductor to the former for the charge transporting material, that that with which it is not necessarily satisfied of electrophotographic properties, such as electrostatic property, sensitivity, and rest potential, cannot be said has the charge transport capability to be the present condition and to have excelled, and development of a durable charge transporting material was desired.

[0007] An organic electroluminescence element is mentioned as technology using a charge transporting material. Promising ** of the use as an inexpensive solid luminescence type big screen full color indicating element is carried out, and, as for the electroluminescent element which uses an organic compound, much researches are done.

[0008] Generally the organic electroluminescence element consists of counter electrodes of the pair which sandwiched the luminous layer and this luminous layer. When an electric field is impressed between two electrodes, an electron is poured in from a cathode and, as for luminescence, a positive hole is poured in from an anode. Furthermore, when this electron and positive hole recombine in a luminous layer and an energy level returns from a conduction band to a valence band, it is the phenomenon which releases energy as a light.

[0009] The conventional organic electroluminescence element had high drive voltage compared with the inorganic electroluminescent element, and luminescent brightness and its luminous efficiency were also low. Moreover, characteristic degradation is also remarkable and it did not result in utilization. The organic electroluminescence element which laminated the thin film containing an organic compound with the high fluorescence amount child efficiency which emits light by the undervoltage not more than 10V is reported, and the interest is attracted in recent years (refer to it applied physics Letters, 51 volumes, 913 pages, and 1987).

[0010] This method used the metal chelate complex for the luminous body layer, used the amine compound for the hole injection layer, high-intensity green luminescence has been obtained, with the direct current voltage of 6-7V, luminance attains several 100cd/m², the maximum luminous efficiency attains 1.5 lm/W, and it has the performance near a practical use field.

[0011] However, the organic electroluminescence element by the present does not have still sufficient luminescent brightness, although luminous efficiency is improved by the improvement of composition. Moreover, it has the big problem of being inferior to the stability in the time of repetition use. Therefore, it has bigger luminescent brightness, and has the charge transport ability which was excellent for development of the organic electroluminescence element excellent in the stability in the time of repetition use, and development of a durable charge transporting material is desired.

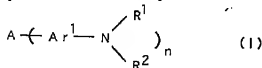
[0012]

[Problem to be solved by the invention] This invention was made in view of the above situations, and there is a place made into the purpose in offering a new amino compound and its manufacturing method useful as a durable charge transporting material or a luminescent material, and its use.

[0013]

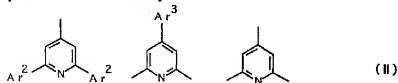
[Means for solving problem] That is, this invention offers the new amino compound expressed with a following general formula (I).

[Chemical formula 22]



A expresses the group expressed with a following general formula (II) among the above-mentioned formula.;

[Chemical formula 23]



Among a general formula (II), Ar² and Ar³ express aryl groups, such as a phenyl group, a biphenyl machine, a terphenyl machine, and a naphthyl group, and they are a phenyl group, a biphenyl machine, etc. preferably. Those groups Alkyl groups, such as a methyl group, an ethyl group, n-propyl group, and an isopropyl group, You may have heterocyclic machines,

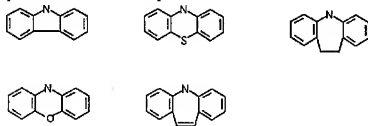
such as aryl groups, such as aralkyl machines, such as alkoxy groups, such as a methoxy group, an ethoxy group, and a propoxy group, and benzyl, a phenyl group, a biphenyl machine, and a naphthyl group, a thienyl group, a furil machine, and a pyridyl machine, as a substituent.

[0014] Among a general formula (I), Ar1 expresses arylene machines, such as a phenylene group, a biphenylene machine, a terphenylene machine, and a naphthylene machine, and it is a phenylene group, a biphenylene machine, etc. preferably. Those groups Alkyl groups, such as a methyl group, an ethyl group, n-propyl group, and an isopropyl group, You may have heterocyclic machines, such as aryl groups, such as aralkyl machines, such as alkoxy groups, such as a methoxy group, an ethoxy group, and a propoxy group, and benzyl, a phenyl group, a biphenyl machine, and a naphthyl group, a thienyl group, a furil machine, and a pyridyl machine, as a substituent.

[0015] n expresses the integer of 1, 2, or 3 among a general formula (I). That is, the joint positions of Ar1 which is the arylene machine combined with a pyridine ring are the 4th place of a pyridine ring, the 2 or 6th place or 2, and the 4 or 6th place, and when two or more Ar1 combine with A, even if the portion to Ar1, R1, and R2 is the same and they differ, it is not cared about.

[0016] R1 and R2 become independent among a general formula (I), respectively, and A methyl group, an ethyl group, Aralkyl machines, such as alkyl groups, such as n-propyl group and an isopropyl group, and benzyl, the nitrogen atom which aromatic heterocycle machines, such as a thienyl group which is not replaced [aryl groups, such as a phenyl group which is not replaced / displacement or /, a biphenyl machine, and a naphthyl group, displacement, or], a furil machine, and a pyridyl machine, are expressed, R1 and R2 are united, and R1 and R2 combine -- a ring, for example,;

[Chemical formula 24]



You may form. It is the ring which the phenyl group which may have a substituent, R1, and R2 were [the ring] united and formed more preferably,;

[Chemical formula 25]

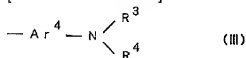


It comes out.

[0017] These rings may have alkoxy groups, such as alkyl groups, such as a methyl group, an ethyl group, n-propyl group, and an isopropyl group, a methoxy group, an ethoxy group, and a propoxy group, as a substituent.

[0018] Moreover, R1, R2, or both are following general formulas (III).;

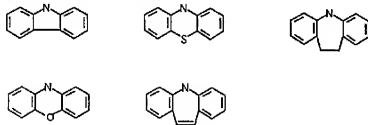
[Chemical formula 26]



In the case of the aryl group which comes out and has the substituent expressed, Ar⁴ express arylene machines, such as a phenylene group, a biphenylene machine, a terphenylene machine, and a naphthylene machine, and they are a phenylene group, a biphenylene machine, etc. preferably.

[0019] Those groups Alkyl groups, such as a methyl group, an ethyl group, n-propyl group, and an isopropyl group, You may have heterocyclic machines, such as aryl groups, such as aralkyl machines, such as alkoxy groups, such as a methoxy group, an ethoxy group, and a propoxy group, and benzyl, a phenyl group, a biphenyl machine, and a naphthyl group, a thienyl group, a furil machine, and a pyridyl machine, as a substituent. R3 and R4 become independent, respectively and A methyl group, an ethyl group, n-propyl group, The phenyl group which is not replaced [aralkyl machines, such as alkyl groups, such as an isopropyl group, and benzyl, displacement, or], the nitrogen atom which aromatic heterocycle machines, such as a thienyl group which is not replaced [aryl groups, such as a biphenyl machine and a naphthyl group, displacement, or], a furil machine, and a pyridyl machine, are expressed, R3 and R4 are united, and R3 and R4 combine -- a ring, for example,;

[Chemical formula 27]



You may form. It is the ring which the phenyl group which may have a substituent, R3, and R4 were [the ring] united and formed more preferably.;

[Chemical formula 28]

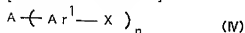


It comes out.

[0020] These rings may have alkoxy groups, such as alkyl groups, such as a methyl group, an ethyl group, n-propyl group, and an isopropyl group, a methoxy group, an ethoxy group, and a propoxy group, as a substituent.

[0021] The amino compound expressed with a general formula (I) can be manufactured using a well-known chemical reaction using a specific source material. For example, halogenated compound expressed with a following general formula (IV);

[Chemical formula 29]



(-- A, Ar¹, and n express this meaning the inside of a general formula (I) among a formula, and X expresses a halogen atom.) -- amino compound; expressed with a following general formula (V)

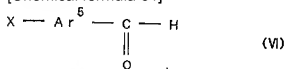
[Chemical formula 30]



(-- the inside of a formula, R¹, and R² -- a general formula (I) -- it can manufacture by making this meaning) react inside.

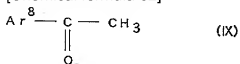
[0022] Moreover, formylation aryl compound expressed with a following general formula (VI) as an example of manufacture of a halogenated compound expressed with said general formula (IV);

[Chemical formula 31]



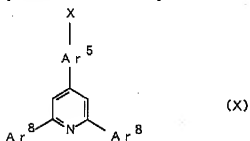
inside of formula, and Ar⁵ -- a phenylene group, a biphenylene machine, and a terphenylene machine -- ; which arylene machines, such as a naphthylene machine, are expressed and is a phenylene group, a biphenylene machine, etc. preferably -- [those groups] Alkyl groups, such as a methyl group, an ethyl group, n-propyl group, and an isopropyl group, Aralkyl machines, such as alkoxy groups, such as a methoxy group, an ethoxy group, and a propoxy group, and benzyl, X which may have heterocyclic machines, such as aryl groups, such as a phenyl group, a biphenyl machine, and a naphthyl group, a thienyl group, a furil machine, and a pyridyl machine, as a substituent express a halogen atom. Acetylation aryl compound expressed with a following general formula (IX);

[Chemical formula 32]



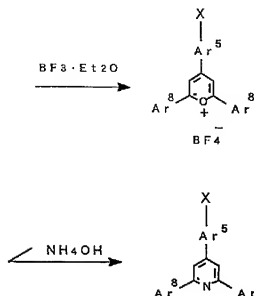
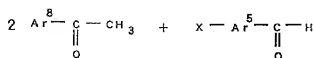
[0023] ; which Ar⁸ express aryl groups, such as a phenyl group, a biphenyl machine, a terphenyl machine, and a naphthyl group, among a formula, and is a phenyl group, a biphenyl machine, etc. preferably -- [those groups] Alkyl groups, such as a methyl group, an ethyl group, n-propyl group, and an isopropyl group, Aralkyl machines, such as alkoxy groups, such as a methoxy group, an ethoxy group, and a propoxy group, and benzyl, Aryl groups, such as a phenyl group, a biphenyl machine, and a naphthyl group, a thienyl group, You may have heterocyclic machines, such as a furil machine and a pyridyl machine, as a substituent. The halogenation 2 and 4 expressed with a following general formula (X) by heat-treating among the aqueous solution of ammonia or an ammonia salt after making it react and obtaining pyrylium salt, 6 thoria reel pyridine compound;

[Chemical formula 33]



(-- Ar⁵ and Ar⁸ are the above and this meaning among a formula, and X expresses a halogen atom.) -- the case where it is made to convert -- following scheme;

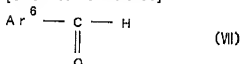
[Chemical formula 34]



It is come out and shown.

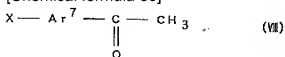
[0024] Moreover, formylation aryl compound expressed with the same method with a following general formula (VII);

[Chemical formula 35]



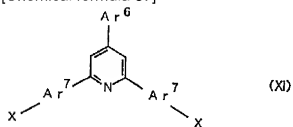
; which Ar⁶ express aryl groups, such as a phenyl group, a biphenyl machine, a terphenyl machine, and a naphthyl group, among a formula, and is a phenyl group, a biphenyl machine, etc. preferably -- [those groups] Alkyl groups, such as a methyl group, an ethyl group, n-propyl group, and an isopropyl group, Aralkyl machines, such as alkoxy groups, such as a methoxy group, an ethoxy group, and a propoxy group, and benzyl, You may have heterocyclic machines, such as aryl groups, such as a phenyl group, a biphenyl machine, and a naphthyl group, a thienyl group, a furil machine, and a pyridyl machine, as a substituent. Acetylation aryl compound expressed with a following general formula (VIII);

[Chemical formula 36]



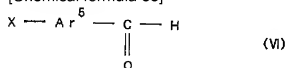
[0025] inside of formula, and Ar⁷ -- a phenylene group, a biphenylene machine, and a terphenylene machine -- ; which arylene machines, such as a naphthylene machine, are expressed and is a phenylene group, a biphenylene machine, etc. preferably -- [those groups] Alkyl groups, such as a methyl group, an ethyl group, n-propyl group, and an isopropyl group, Aralkyl machines, such as alkoxy groups, such as a methoxy group, an ethoxy group, and a propoxy group, and benzyl; X which may have heterocyclic machines, such as aryl groups, such as a phenyl group, a biphenyl machine, and a naphthyl group, a thienyl group, a furil machine, and a pyridyl machine, as a substituent express a halogen atom. The halogenation 2 and 4 which is made to react and is expressed with an account general formula (XI), 6 thoria reel pyridine compound;

[Chemical formula 37]



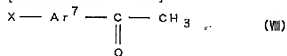
[0026] (-- Ar⁶ and Ar⁷ are the above and this meaning among a formula, and X expresses a halogen atom.) -- formylation aryl compound; expressed with OK or a following general formula (VI)

[Chemical formula 38]



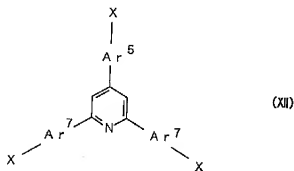
(-- the inside of a formula, Ar⁵, and X -- the above and this meaning.) -- acetylation aryl compound; expressed with a following general formula (VIII)

[Chemical formula 39]



(-- the inside of a formula, Ar⁷, and X -- the above and this meaning.) -- the halogenation 2 and 4 which is made to react and is expressed with a following general formula (XII), and 6 thoria reel pyridine compound;

[Chemical formula 40]



(-- Ar^5 and Ar^7 are the above and this meaning among a formula, and even if the same, X which are not cared about even if it differs express a halogen atom.) -- it can also obtain.

[0027] Amino compound expressed with these halogenated compounds and following general formulas (V);

[Chemical formula 41]



(-- the inside of a formula, R^1 , and R^2 -- the above and this meaning.) -- the amino compound expressed with a general formula (I) can be manufactured by making it react. A Ullmann reaction can perform synthesis of the above-mentioned amino compound under existence with a basic compound or a transition metal compound catalyst, and a solvent.

[0028] Although the hydroxide of an alkali metal, carbonate, hydrogencarbonate, alcoholate, etc. are common as a basic compound used for synthesis of the above-mentioned amino compound, it is also possible to use an organic base like the 4th class ammonium compound, fatty amine, or aromatic amine. In this, carbonate and hydrogencarbonate of an alkali metal or the 4th class ammonium are used as a desirable thing. Furthermore, carbonate, hydrogencarbonate, and alcoholate of the viewpoint of a rate of reaction and thermal stability to an alkali metal are the most desirable.

[0029] Although metals, such as Cu , Fe , nickel, Cr , V , Pd , Pt , and Ag , and those compounds are used, for example as the transition metal used for synthesis, or a transition metal compound catalyst, copper from a point of a yield, palladium, or those compounds are desirable. Although there is no limitation in particular as a copper compound and almost all copper compounds are used A cuprous iodide, cuprous chloride, cuprous oxide, the first copper of bromination, a cuprous cyanide, the first copper of sulfuric acid, cupric sulfate, cupric chloride, the second copper of hydroxylation, cupric oxide, the second copper of bromination, the second copper of phosphoric acid, the first copper of nitric acid, the second copper of nitric acid, copper carbonate, the first copper of acetic acid, the second copper of acetic acid, etc. are desirable. Also in it, a cuprous iodide, cuprous chloride, cuprous oxide, the first copper of

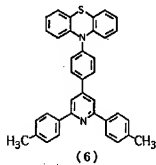
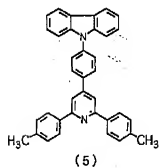
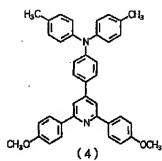
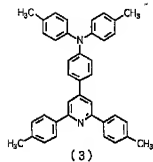
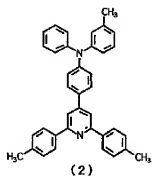
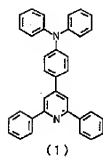
bromination, the first copper of sulfuric acid, cupric sulfate, cupric chloride, cupric oxide, the second copper of bromination, the first copper of acetic acid, and the second copper of acetic acid are easily suitable at an available point. Also as a palladium compound, halide, sulfate, nitrate, an organic acid salt, etc. can be used. The amount of a transition metal and its compound used is 0.5-500mol% of a halogenated compound made to react.

[0030] Although to use the solvent used by synthesis generally and what is necessary is just a solvent, aprotic polar solvents, such as dichlorobenzene, nitrobenzene, dimethylformamide, dimethyl sulfoxide, and N-methyl pyrrolidone, are used preferably. Generally, although a reaction is performed in a temperature span (100 degrees C - 250 degrees C) under ordinary pressure, even if it carries out under pressurization, it does not interfere. After removing the solid content after termination of a reaction, and in reaction liquid, reduced pressure distilling off of the solvent can be carried out, and a target can be obtained.

[0031] The following are mentioned as an example of the above-mentioned amino compound. In addition, the thing which has presented the amino compound of this invention restrictively is not indicating these illustration by the intention limited to these, either.

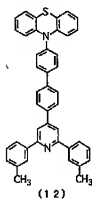
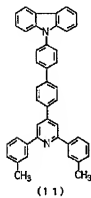
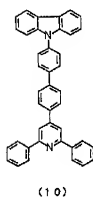
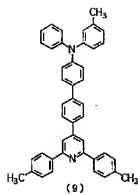
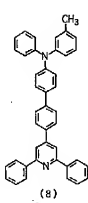
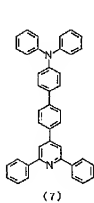
[0032]

[Chemical formula 42]



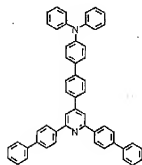
[0033]

[Chemical formula 43]

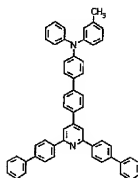


[0034]

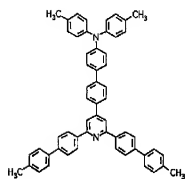
[Chemical formula 44]



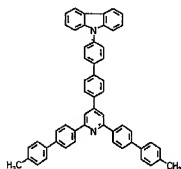
(13)



(14)



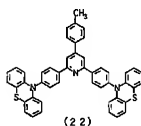
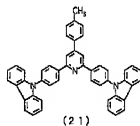
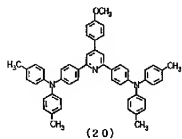
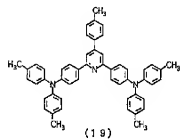
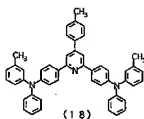
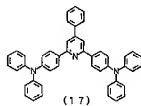
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(16)

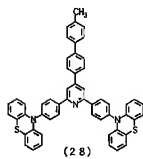
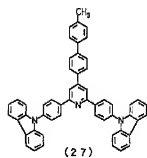
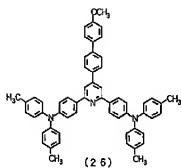
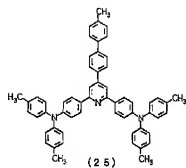
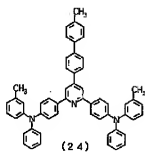
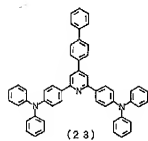
[0035]

[Chemical formula 45]



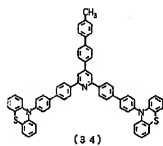
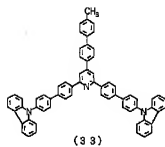
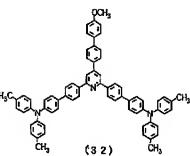
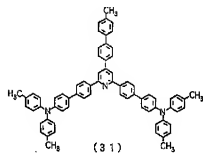
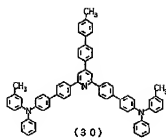
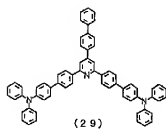
[0036]

[Chemical formula 46]



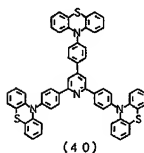
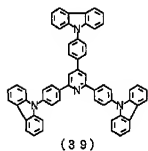
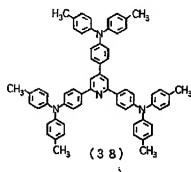
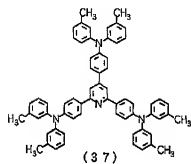
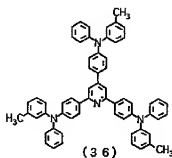
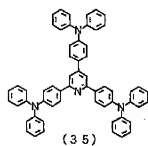
[0037]

[Chemical formula 47]



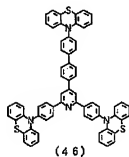
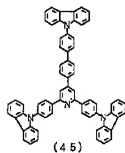
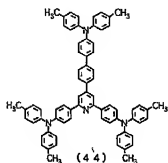
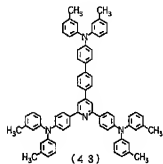
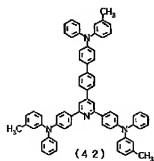
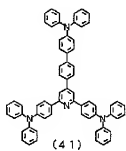
[0038]

[Chemical formula 48]



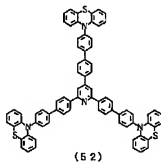
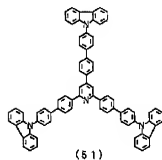
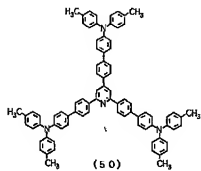
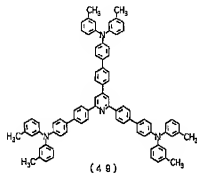
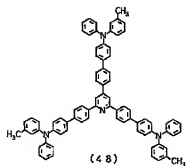
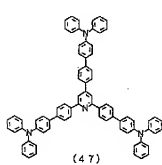
[0039]

[Chemical formula 49]



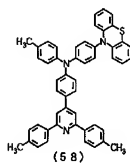
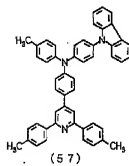
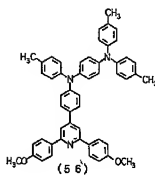
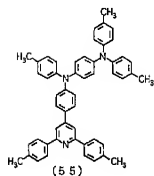
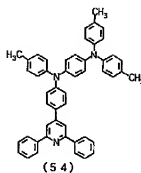
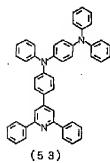
[0040]

[Chemical formula 50]



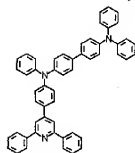
[0041]

[Chemical formula 51]

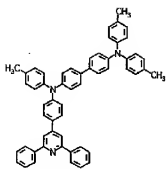


[0042]

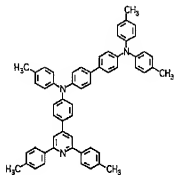
[Chemical formula 52]



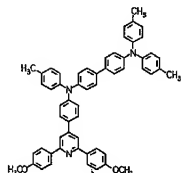
(5 9)



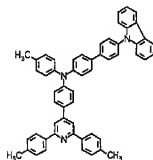
(6 0)



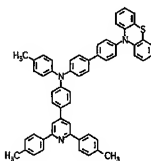
(6 1)



(6 2)



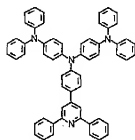
(6 3)



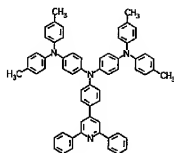
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[0043]

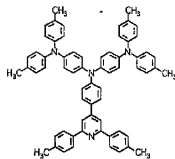
[Chemical formula 53]



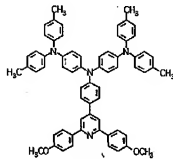
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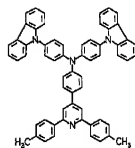
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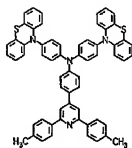
(6 7)



(6 8)



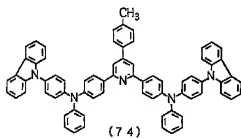
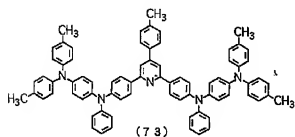
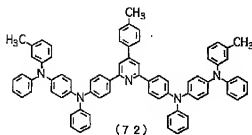
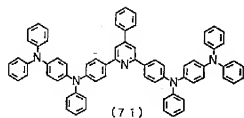
(6 9)



(7 0)

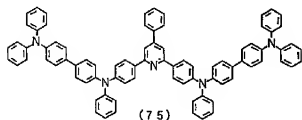
[0044]

[Chemical formula 54]

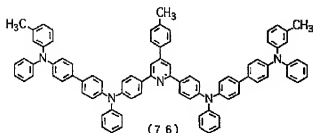


[0045]

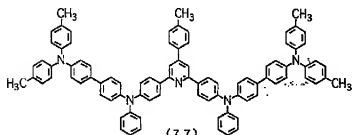
[Chemical formula 55]



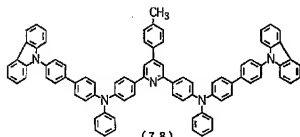
(75)



(76)



(77)



(78)

[0046] The amino compound expressed with a general formula (I) is excellent in the charge transport function, especially the positive hole transportation function, and excellent in endurance and a heat-resisting property. Therefore, the amino compound expressed with the general formula (I) of this invention is excellent in the use as a charge transporting material, and can consider various application using such a function, for example, can use it conveniently as a photo conductor or a charge transporting material of an organic electroluminescence element.

[0047] First, the case where the amino compound shown by a general formula (I) is used as an electrophotography photo conductor is explained. Although it can be used also in which layer of an electrophotography photo conductor, since the amino compound shown by a general

formula (I) has high charge transport characteristics, it is desirable to use it as a charge transporting material.

[0048] Since the charge which the above-mentioned amino compound acted as a charge transport substance, and generated by optical absorption, or was poured in from the electrode can be conveyed very efficiently, it is possible to obtain the photo conductor excellent in sensitivity and high speed response nature. Moreover, since this compound is excellent in ozone resistance and light stability, it can obtain the photo conductor excellent in endurance.

[0049] The photo conductor which forms the lamina type photosensitive layer which distributes a charge generating material and a charge transporting material to suitable binder resin on a conductive substrate as an electrophotography photo conductor, for example, The photo conductor which laminates an undercoating layer, a photosensitive layer, and a surface protection layer one by one is mentioned on the photo conductor which laminates a charge generating layer and a charge transport layer as a photosensitive layer on a base material, the photo conductor which forms an undercoating layer and a conductive layer on a base material, and forms a photosensitive layer on it, or a base material.

[0050] As a base material, what was made into foil, such as copper, an aluminium, iron, nickel, and stainless steel, or a board, or drum form is used. Moreover, what prepared the layer of conductive compounds, such as vacuum deposition, a thing which carried out electroless deposition or a conductive polymer, indium oxide, and tin oxide, for these metals by spreading or vacuum evaporation on paper or a plastics drum at paper, a plastics drum, etc. is usable. The aluminium pipe which the aluminium was generally used, for example, gave drawing-out processing after extruding is cut. About 0.2-0.3mm was cut and made to the outside surface using cutting tools, such as a diamond tool, (cutting pipe), What finished the outside surface by ironing after carrying out deep drawing of the aluminium disk and considering it as the shape of a cup (DI pipe), After carrying out impact processing of the aluminium disk and considering it as the shape of a cup, what finished the outside surface by ironing (EI pipe), the thing (ED pipe) cold-thinning-omission-processed after extruding, etc. are mentioned. Moreover, you may use what cut these surfaces further.

[0051] When forming an undercoating layer on a base material, using the oxide film obtained by making anodize the base material surface as an undercoating layer is often performed. When a base material is an aluminum alloy, it is effective to use an alumite layer as an undercoating layer. Moreover, a lower resistance compound is distributed the solution in which suitable resin was dissolved, and in it, these solution and dispersion liquid are applied on the above-mentioned conductive substrate, and it is formed also by making it dry. In this case, polyimide, polyamide, cellulose nitrate, polyvinyl butyral, polyvinyl alcohol, etc. may be suitable, and may make these resin distribute a lower resistance compound as a material used for an undercoating layer. As a lower resistance compound, organic compounds, such as

metallic compounds, such as tin oxide, titanium oxide, zinc oxide, zirconium oxide, and magnesium fluoride, an organic pigment and an electronic suction nature organic compound, and an organometallic complex, are used suitably. As for the thickness of an undercoating layer, about 0.2-3 micrometers is preferably desirable 0.1-5 micrometers.

[0052] Although a photosensitive layer is formed on the above-mentioned base material or an undercoating layer, the case where a charge generating layer and a charge transport layer are laminated as a photosensitive layer is explained hereafter. If in forming a charge generating layer you carry out the vacuum deposition of the charge generating material, or you make it dissolve in a suitable solvent, and it applies or there is a suitable solvent or necessity about a pigment, spreading desiccation will be carried out and the coating liquid which was made to distribute in the solution in which binding resin was dissolved, and was produced will be formed. What saw from the adhesive point and was distributed in resin is good. As for the thickness of a charge generating layer, about 0.05-1 micrometer is preferably desirable 0.01-2 micrometers. Although 100 or less weight % is desirable to a charge generating material as for the binder resin used in order to form a charge generating layer, it is not this limitation. You may use two or more kinds of resin, combining it.

[0053] as the charge generating material used for a charge generating layer -- azo pigment (screw azo pigment --) The thoria reel methane series color, thia gin system color containing tris azo pigment, An OKISAJIN system color, xanthene dye, cyanine dye, a styryl system pigment, Organic system pigments, such as a pyrylium system color, the Quinacridone system pigment, an indigo system pigment, a perylene system pigment, a polycyclic quinone system pigment, a screw benzimidazole system pigment, an in DASURON system pigment, a SUKUARIUMU system pigment, and phthalocyanine pigment, a color, etc. are mentioned. If it is the material which absorbs light and generates a charge carrier in very high probability also except this, even if it is which material, it can be used, but especially an azo (screw system, tris system) pigment and a phthalocyanine pigment are desirable.

[0054] moreover, as resin used with this charge generating material For example, saturated polyester resin, polyamide resin, an acrylate resin, an ethylene-vinylacetate copolymer, An ion bridge formation olefine copolymer (ionomer), a styrene butadiene block copolymer, Polyarylate, polycarbonate, a vinyl chloride vinyl acetate copolymer, Cellulose ester, polyimide, styrol resin, polyacetal resin, Thermoplastic binders, such as phenoxy resin, an epoxy resin, urethane resin, Photo electroconductive polymer, such as heat-curing binders, such as silicone resin, a phenol resin, a melamine resin, xylene resin, alkyd resin, and thermosetting acrylics, a photo-setting resin, poly-N-vinylcarbazole, polyvinyl pyrene, and polyvinyl anthracene, can be used.

[0055] With these resin, the above-mentioned charge generating material Methanol, ethanol, Alcohols, such as isopropanol, acetone, methyl ethyl ketone, Amide, such as ketone [, such as

cyclohexanone,], N, and N-dimethylacetamide, Sulfoxide, such as dimethyl sulfoxide, tetrahydrofuran, dioxane, Ether, such as ethylene glycol monomethyl ether, methyl acetate, Ester species, such as ethyl acetate, chloroform, a methylene chloride, dichloroethane, Aliphatic series halogenated hydrocarbon, such as carbon tetrachloride and trichloroethylene, Or the sensitization coating liquid which was made to distribute or dissolve in organic solvents, such as aromatic series, such as benzene, toluene, xylene, ligroin, monochlorobenzene, and dichlorobenzene, and was prepared is applied on the above-mentioned conductive substrate, it is made to dry and a charge generating layer is prepared. The charge transport layer containing a charge transporting material and binder resin is prepared on the charge generating layer formed as mentioned above.

[0056] As binder resin, for example Polycarbonate, polyarylate, Saturated polyester resin, polyamide resin, an acrylate resin, an ethylene-vinylacetate copolymer, An ion bridge formation olefine copolymer (ionomer), a styrene butadiene block copolymer, Polyarylate, polycarbonate, a vinyl chloride vinyl acetate copolymer, Cellulose ester, polyimide, styrol resin, polyacetal resin, Thermoplastic binders, such as phenoxy resin, an epoxy resin, urethane resin, Photo electroconductive polymer, such as heat-curing binders, such as silicone resin, a phenol resin, a melamine resin, xylene resin, alkyd resin, and thermosetting acrylics, a photo-setting resin, poly-N-vinylcarbazole, polyvinyl pyrene, and polyvinyl anthracene, can be used.

[0057] In forming the charge transport layer of a photo conductor, the coating solution obtained by making dissolve a charge transporting material and binder resin in a suitable solvent is applied on the above-mentioned charge generating layer, and is dried. As for the thickness of a charge transport layer, about 10-50 micrometers is preferably desirable 5-60 micrometers.

[0058] Moreover, although content of the charge transporting material in a charge transport layer cannot generally be ***** (ed) according to the kind, it is desirable 0.02 - 2 weight part and to carry out 0.5-1.2 weight part addition preferably to a binder resin 1 weight part in general. Two or more sorts of compounds expressed with a general formula (I) may be used for the charge transporting material used for a photo conductor, and can also be used for it combining other charge transporting materials.

[0059] As other charge transporting materials used, a hydrazone compound, a pyrazoline compound, A styryl compound, a triphenylmethane color compound, an oxadiazole compound, A carbazole compound, a stilbene compound, an enamine compound, an oxazole compound, Hole transporting materials, such as a triphenylamine compound, a tetra-phenyl benzidine compound, and an azine compound, A fluorenone compound, an anthra quinodimethan compound, a diphenoquinone compound, A stilbene quinone compound, a thiopyran dioxide compound, an oxadiazole compound, Various compounds, such as electron transport materials, such as a pel RENTE truck carboxylic acid compound, a full ORENIRIDEN methane compound, an anthraquinone compound, the Antron compound, and a cyano vinyl compound,

can be used.

[0060] As said solvent used in the case of formation of a charge transport layer For example, ketone, such as benzene, toluene, xylene, and chlorobenzene, Alcohols, such as methanol, ethanol, and isopropanol, ethyl acetate, Ester, such as ethylcellosolve, carbon tetrachloride, carbon tetrabromide, chloroform, Ether, such as halogenated hydrocarbon, such as dichloromethane and tetrachloroethane, tetrahydrofuran, and dioxane, dimethylformamide, dimethyl sulfoxide, diethyl formamide, etc. can be mentioned. These solvents may be used by an one-sort independent, or may use two or more sorts together as a mixed solvent.

[0061] When forming a laminated type photosensitive layer which was mentioned above, spreading of a charge transport layer and a charge generating layer can be performed using various kinds of coaters by a well-known method. Specifically, a coating method with various immersion coating method, spray coating method, spinner coating methods, blade coating methods, roller coating methods, wire bar coating methods, etc. can be used. Moreover, you may make well-known additives, such as an additive for controlling the additive for raising membrane formation nature or flexibility in a charge transport layer, and accumulation of rest potential, contain especially in the case of a laminated type photosensitive layer which was mentioned above.

[0062] As these concrete compounds, halogenation paraffin, polychlorinated biphenyl, Dimethylnaphtalene, o-terphenyl, m-terphenyl, p-terphenyl, Diethyl biphenyl, hydrogenation terphenyl, diisopropyl biphenyl, Benzyl biphenyl, diisopropyl naphthalene, dibenzofuran, Plasticizers, such as 9 and 10-dihydroxy phenanthrene, chloranil, tetracyano quinodimethan, Tetracyanoethylene, a trinitro fluorenone, dicyano benzoquinone, Sensitizers, such as electronic suction nature sensitizers, such as tetra-chloro phthalic anhydride, 3, 5-dinitro benzoic acid, and a cyano vinyl compound, Methyl Violet, Rhodamine B, a cyanine dye, pyrylium salt, and thia pyrylium salt, are usable.

[0063] The adhesive property between a charge transport layer and a charge generating layer is improved, and when a photosensitive layer is constituted by lamination with a charge transport layer and a charge generating layer since the internal stress of the layer is reduced so that there are many amounts of addition of a plasticizer, in a lamina type case, the adhesive property between a photosensitive layer and a base material is improved. however -- receiving a charge transporting material 100 weight part, since problems, such as a fall of mechanical hardness and a fall of sensitivity, will occur if too large -- a 1 - 100 weight part -- it is preferably desirable 5 - 80 weight part and to carry out 10-50 weight part grade addition more preferably. the amount of addition of a sensitizer receives a charge transporting material 100 weight part -- 0.01 - 20 weight part -- it is preferably desirable 0.1 - 10 weight part and to carry out 0.5-8 weight part grade addition more preferably.

[0064] Furthermore, in the photosensitive layer, especially charge transport layer of a photo

conductor, you may add an antioxidant for the purpose of ozone deterioration prevention. As an antioxidant, hindered phenol, hindered amine, Para Feni range amine, hydroquinone, SUPIRO chroman, spiro Inn Danone, hydronalium quinoline and these derivatives, an organophosphorus compound, an organosulfur compound, etc. are mentioned.

[0065] Although an adhesive property improves so that there are many amounts of addition of an antioxidant, if too large, problems, such as a fall of mechanical hardness and a fall of sensitivity, will occur, and if too small, sufficient effect of antioxidizing will not be acquired. therefore -- as opposed to a charge transporting material 100 weight part -- 0.1 - 50 weight part -- it is preferably desirable 1 - 30 weight part and to carry out 3-20 weight part grade addition more preferably. the case where an antioxidant and said plasticizer are used together -- the total amount of the amount of addition -- a 1 - 120 weight part -- it is preferably desirable a 5 - 100 weight part and to carry out 10-80 weight part grade addition more preferably. Since a crystal deposit is caused or an adhesive property does not improve so much when the solubility of a plasticizer or an antioxidant is low, or when a fusing point is high, it is desirable that the fusing point of a plasticizer or an antioxidant uses a compound of 100 degrees C or less.

[0066] You may prepare a conductive layer between the base material which constitutes a photo conductor, and an undercoating layer. As a conductive layer, what distributed metal things, such as an aluminium, iron, and nickel, in resin, and the thing which distributed metal oxides, such as conductive tin oxide, titanium oxide, antimony oxide, zirconium oxide, and ITO (indium, stannic acid ghost solid solution), in resin are used suitably.

[0067] Furthermore, you may prepare a surface protection layer on a photosensitive layer. As for the thickness of a surface protection layer, 5 micrometers or less are desirable. As a material used for a surface protection layer, what distributed lower resistance substances, such as remaining as it is or tin oxide, and indium oxide, for polymer, such as an acrylate resin, poly aryl resin, polycarbonate resin, urethane resin, a thermosetting resin, and a photo-setting resin, is usable. Moreover, you may use an organic plasma polymerization film as a surface protection layer. An organic plasma polymerization film may also contain oxygen, nitrogen, halogen, the 3rd group of the periodic table, and the 5th group atom suitably if needed.

[0068] In addition, what is necessary is just to form a charge generating material and a charge transporting material a dip coat and by carrying out a spin coat using the liquid which dissolved in suitable resin with binder resin, when forming a lamina type photosensitive layer.

[0069] Next, the case where the compound shown by a general formula (I) is used as a material of an organic electroluminescence element is explained. The embodiment of the organic electroluminescence element was typically shown in drawing 1 - drawing 4. (1) is an anode among drawing 1, and on it, the organic hole injection transportation layer (2), the organic luminous layer (3), and the cathode (4) have taken the composition laminated one by

one, and contain the amino compound expressed with the above-mentioned general formula (I) in this organic hole injection transportation layer.

[0070] drawing 2 -- it is and (1) is an anode -- an it top -- an organic hole injection transportation layer (2) and an organic luminous layer (3) -- The electron injection transportation layer (5) and the cathode (4) have taken the composition laminated one by one, and contain the amino compound expressed with the above-mentioned general formula (I) to this organic hole injection transportation layer or/and an organic luminous layer.

[0071] In drawing 3, (1) is an anode, and the organic luminous layer (3) organicity electron injection transportation layer (5) and the cathode (4) have taken on it the composition laminated one by one, and it contains the amino compound expressed with the above-mentioned general formula (I) to this organic luminous layer.

[0072] drawing 4 -- the composition by which it is, (1) is an anode and the organic luminous layer (3) and the cathode (4) were laminated one by one on it -- **** -- it is, the organic luminescent material (6) and the charge transporting material (7) are included in this organic luminous layer, and the amino compound expressed with the above-mentioned general formula (I) by this charge transporting material is used.

[0073] An anode (1) and a cathode (4) are connected by lead wire (8), and, as for the organic electroluminescence element of the above-mentioned composition, an organic luminous layer (3) emits light by impressing voltage to an anode (1) and a cathode (4). If there is necessity, a well-known luminescent material, a luminescence auxiliary material, and the charge transporting material that performs carrier transportation can also be used for an organic luminous layer, an organic hole injection transportation layer, and an electron injection transportation layer.

[0074] The specific amino compound expressed with a general formula (I) may have small ionization potential, luminescence starting voltage required [since positive hole transportation ability is large] in order to make an organic electroluminescence element emit light may be low, therefore it is stabilized and it is thought that prolonged luminescence is closed if . Moreover, when an amino compound is used as an organic luminous body, it is thought that the function as a luminescent material of the amino compound itself and thermal stability have contributed.

[0075] A thing with the larger work function as a conductive substance used as an anode (1) of an organic electroluminescence element than 4eV is good. Carbon, an aluminium, vanadium, iron, Cobalt, nickel, copper, zinc, Organic conductive resin, such as conductive metal compounds, such as tungsten, silver, gold, platinum and those alloys, and tin oxide, indium oxide, antimony oxide, zinc oxide, zirconium oxide, and also poly thiophene, and polypyrrole, is used.

[0076] What has a work function smaller than 4eV as a metal which forms a cathode (4) is

desirable, and magnesium, calcium, tin, lead, titanium, yttrium, lithium, gadolinium, ytterbium, ruthenium, manganese, and those alloys are used. As long as an anode and a cathode have necessity, they may be formed of the lamination more than two-layer.

[0077] In an organic electroluminescence element, it is necessary to use either an anode (1) or a cathode (4) as a transparent electrode at least so that luminescence may be seen. Under the present circumstances, since transparency will be easy to be spoiled if a transparent electrode is used for a cathode, it is desirable to use an anode as a transparent electrode. What is necessary is to mention above on a transparent base, and just to form so that desired translucency and conductivity may be secured using the means of distributing means, such as vacuum deposition and sputtering, a sol-gel method or resin, etc., and applying using a conductive substance [like] when forming a transparent electrode.

[0078] If have moderate hardness as a transparent base and the bad influence by the heat by vacuum evaporatio~~n~~o etc. is not received at the time of organic electroluminescence element production, it will not be limited especially if transparent, but what starting is illustrated It is also possible to use a glass substrate, transparent resin, for example, polyethylene, polypropylene, polyether sulphone, a polyether ether ketone, polyester, etc. You may use these, although commercial items, such as ITO and NESA, are known as that by which the transparent electrode was formed on the glass substrate.

[0079] As an example of production of an organic electroluminescence element, an amino compound is explained using the composition (drawing 1) at the time of using for an organic hole injection transportation layer. First, an organic hole injection transportation layer (2) is formed on the anode (1) mentioned above. an organic hole injection transportation layer (2) may vapor-deposit and form the amino compound expressed with said held general formula (I), and may form the solution which dissolved this amino compound, and the solution which dissolved with suitable resin by the applying methods, such as a dip coat and a spin coat.

[0080] What is necessary is for the thickness to be usually about 1-500nm, when forming with vacuum deposition, and just to form in about 5-1000nm, when forming by the applying method. It is necessary to make high the applied voltage for making light emit, and luminous efficiency is bad and tends to cause deterioration of an organic electroluminescence element, so that the thickness to form is thick. Moreover, if thickness becomes thin, although luminous efficiency becomes good, it will be broken down, and the life of an element will become short in ****.

[0081] The compound of a general formula (I) can be used combining it with other charge transporting materials. Specifically A phthalocyanine compound, a naphthalocyanine compound, a porphyrin compound, Oxadiazole, triazole, imidazole, imidazoline, imidazole thione, Pyrazoline, pyrazolone, tetrahydro imidazole, oxazole, Oxadiazole, hydrazone, acyl hydrazone, poly aryl alkane, Although polymeric materials, such as stilbene, butadiene, benzidine type thoria reel amine, diamine type thoria reel amine, etc. those derivatives and

polyvinyl carbazole, polysilane, and a conductive polymer, etc. are mentioned. In addition, it can be used if it is the compound which has the hole injection effect which was excellent to photogene, and prevented movement to the electronic injection layer or electron transport material of an exciton generated by the luminous layer, and was excellent in thin film organization potency.

[0082] An organic luminous layer is formed on the above-mentioned organic hole injection transportation layer (2). As the organic luminescent material used for an organic luminous layer, and a luminescence auxiliary material A well-known thing is usable and For example, EPIDO lysine, 2, 5-bis(5, 7-G t-pentyl 2-benzoxazolyl) thiophene, 2 and 2-(1, 4-phenylene divinylenes) screw benzothiazole, 2 and 2-(4 and 4-biphenylene) screw benzothiazole, 5-methyl 2-{2-[4-(5-methyl 2-benzoxazolyl) phenyl] vinyl} benzoxazole, 2, 5-bis(5-methyl 2-benzoxazolyl) thiophene, Anthracene, naphthalene, phenanthrene, pyrene, chrysene, perylene, Peri non, 1, 4-diphenyl butadiene, tetra-phenyl butadiene, Coumarin, acridine, stilbene, 2-(4-biphenyl)-6-phenylbenzo oxazole, Aluminium tris oxine, magnesium screw oxine, bis(benzoeight-quinolinol) zinc, Bis(2-methyl 8-quinolate) aluminium oxide, indium tris oxine, aluminium tris (5-methyl oxine), lithium oxine, gallium tris oxine, a calcium screw (5-chloro oxine), Pori zinc-bis(8-hydroxy 5-KINORI noryl) methane, dilithium EPINDORI dione, zinc screw oxine, 1, and 2-phtalo peri non, 1 and 2-naphthalo peri non, a tris (8-hydroxy quinoline) aluminium complex etc. can be mentioned.

[0083] Moreover, general fluorescent dye, for example, a coumarin color, a perylene color, the Piran color, a thiopyran color, Pori methine dye, a merocyanine color, an imidazole color, etc. can be used. As a desirable material, a chelation oxy-NOIDO compound is mentioned among these especially. The lamina composition of the above mentioned photogene is sufficient as an organic luminous layer, and in order to adjust characteristics, such as a luminescent color and luminescence intensity, it is good also as multilayer composition. Moreover, two or more sorts of photogene may be mixed, or you may dope to a luminous layer.

[0084] An organic luminous layer (3) may vapor-deposit and form the above photogene, and may form the liquid which dissolved with the solution which dissolved this photogene, and suitable resin by the applying methods, such as a dip coat and a spin coat. Moreover, you may use as photogene the amino compound expressed with a general formula (I). What is necessary is just to form the thickness in about 5-1000nm, when usually forming by about 1-500nm and the applying method when forming with vacuum deposition. It is necessary to make high the applied voltage for making light emit, so that the thickness to form is thick, and luminous efficiency is bad and tends to cause deterioration of an organic electroluminescence element. Moreover, if thickness becomes thin, although luminous efficiency becomes good, it will become easy to break it down, and the life of an element will become short. Next, the above mentioned cathode (4) is formed on an organic luminous layer (3), and it is considered

as an organic electroluminescence element.

[0085] An amino compound can be used for a hole injection transportation layer, an organic luminous layer, or both when laminating a hole injection transportation layer (2), an organic luminous layer (3), and an electron injection transportation layer (5), as shown in drawing 2 . In this case, a hole injection transportation layer can be formed in the procedure same with having mentioned above, without using an amino compound, using an amino compound. It can form in the procedure same with having mentioned the organic luminous layer above, and an amino compound may be used as photogene. When using an amino compound as photogene, it is desirable to mix other photogene or to dope to an organic luminous layer. An electron injection transportation layer can be formed by conventionally well-known methods, such as vacuum deposition and the applying method, like a hole injection transportation layer or an organic luminous layer using an electron transport material.

[0086] As an electron transport material, for example A fluorenone, anthra quinodimethan, Although there are diphenylquinone, stilbene quinone, thiopyran dioxide, oxadiazole, perylene tetracarboxylic acid, full ORENIRIDEN methane, anthraquinone, Antron, etc. and those derivatives If it is the compound which has the capability to convey an electron, has the electron injection effect which was excellent to a luminous layer or photogene, and prevented movement to the hole injection layer or hole transporting material of an exciton generated by the luminous layer, and was excellent in thin film organization potency, it will not be limited to these.

[0087] As shown in drawing 3 , when laminating an organic luminous layer (3) and an electron injection transportation layer (5), an organic luminous layer can be formed using an amino compound in the procedure same with having mentioned above on an anode (1). Moreover, an electron injection transportation layer can be formed the same with having mentioned above.

[0088] Moreover, in each above-mentioned composition, a hole injection transportation layer separates a hole injection function and a positive hole transportation function, and is good also as two-layer composition of a hole injection layer and a positive hole transportation layer. In this case, it is desirable to use the amino compound of this invention expressed with a hole injection layer by a general formula (I).

[0089] Positive hole transportation material well-known as a positive hole transportation layer can be used. For example, N, N' - diphenyl N and N'-bis(3-methylphenyl)-1, 1' - diphenyl 4 and 4'-diamine, N, N' - diphenyl N and N'-bis(4-methylphenyl)-1, 1' - diphenyl 4 and 4'-diamine, N, N' - diphenyl N and N'-bis(1-naphthyl)-1, 1' - diphenyl 4 and 4'-diamine, N, N' - diphenyl N and N'-bis(2-naphthyl)-1, 1' - diphenyl 4 and 4'-diamine, N and N'-tetra (4-methylphenyl)-1, 1' - diphenyl 4 and 4'-diamine, N and N'-tetra (4-methylphenyl)-1 and 1' - bis(3-methylphenyl)-4, 4'-diamine, N, N' - diphenyl N and N'-bis(3-methylphenyl)-1, and 1' - bis(3-methylphenyl)-4, 4'-diamine, N -- N' -- a screw (N-carbazolyl) -one -- one -- - diphenyl -- four -- four -- - diamine

-- four -- four -- ' -- four -- " - tris (N-carbazolyl) -- triphenylamine -- N, N', N"- triphenyl N, N', N"- tris (3-methylphenyl)-1, 3, 5-bis(4-aminophenyl) benzene, four -- four -- ' -- four -- " - tris -- [-- N -- N -- ' -- N -- " - triphenyl -- N -- N -- ' -- N -- " - tris (3-methylphenyl) --] -- triphenylamine -- N and N'-diphenyl N, N'- bis(4-methylphenyl)-1, 1'-bis(3-methylphenyl)-4, and 4'- diamine, N, N'-diphenyl N, N'-(3-methylphenyl)-1, 1' - biphenyl 4 and 4'-diamine, etc. can be mentioned. Two or more sorts may use these, mixing.

[0090] An electron injection transportation layer also separates an electron injection function and an electronic transportation function, and is good also as two-layer composition of an electronic injection layer and an electron transport layer.

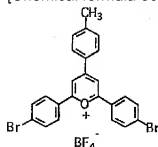
[0091] In order to form the organic luminous layer of lamina composition as shown in drawing 4 Mixed formation of an organic luminescent material and the charge transporting material may be carried out with vapor codeposition, and you may form a dip coat and by carrying out a spin coat using the liquid which dissolved with the solution which dissolved the organic luminescent material and the charge transporting material, and suitable resin. The electron transport material or hole transporting material mentioned above as a charge transporting material may be used, these may be mixed and used, and two or more sorts may be mixed and they may use the material of the same transportability. What is necessary is for the thickness to be usually 5-200nm, when forming an organic luminous layer with vacuum deposition, and just to form in about 10-500nm, when forming by the applying method. In the case of the applying method, if photo electroconductive polymer like polyvinyl carbazole or polyvinyl acetylene is used as resin mixed and used, good characteristics can be obtained especially. As mentioned above, although explained taking the case of the case where each layer is formed on an anode (1), you may form each layer in the procedure same with having mentioned above on the cathode (4).

[0092] An organic electroluminescence element emits light by connecting suitable lead wire (8), such as a nichrome wire, a gold streak, copper wire, and a platinum line, to a cathode and an anode, and impressing the suitable voltage (Vs) for two electrodes. The organic electroluminescence element of this invention is applicable to various kinds of display devices or a display unit. A work example is indicated below and this invention is explained to it. the inside of a work example, and a "part" -- a certain ** -- a "weight part" is expressed unless it refuses in particular.

[0093] Synthetic example 1 (synthesis of a compound (19))
p-torr aldehyde 5.0g (0.042mol) and 4'-bromo acetophenone 16.6g (0.083mol) are put in, toluene 20ml was added to this and the 200ml three neck flask which formed the water-cooled condenser tube was dissolved in it. Next, 17.7g (0.125mol) of boron trifluoride-diethylether complexes are dissolved in toluene 10ml, and after adding agitating this solution among a room temperature, heating channeling back was carried out for 8 hours. Reaction liquid was

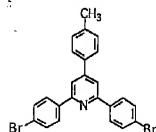
cooled to the room temperature, it filtered, reduced pressure drying of the crystal which added 1 and 4-dioxane 200ml and deposited was carried out to this, and the following pyrylium salt and 13.7g (58% of yield) were obtained as a yellow crystal.

[Chemical formula 56]



[0094] Next, 10.0g (0.018mol) of the above-mentioned pyrylium salt is put in, tetrahydrofuran 100ml was added to this and the 1000ml three neck flask was dissolved in it. Furthermore, after adding 300ml of aqueous ammonia 14%, it agitated at 50 degrees C for 1 hour. Recrystallization treatment of the crystal obtained in the product by carrying out reduced pressure distilling off of the solvent after extraction by dichloromethane was carried out with the mixed solvent of dichloromethane/hexane, and the following bromo-ized triphenyl pyridine derivative and 4.5g (54% of yield) were obtained as a reddish brown crystal.

[Chemical formula 57]



[0095] To a 100ml three neck flask, then, 1.5g (0.003mol) of the above-mentioned bromo-ized triphenyl pyridine derivatives, p and p'-JITORIRU amine 1.4g (0.069mol), sodium t-butoxide 0.8g (0.0083mol), After putting in acetic acid palladium 0.04g (0.00017mol) and tri t-butyl phosphine 0.14g (0.00067mol) and adding 5ml of O-xylene to this as a solvent, it agitated at 120 degrees C under nitrogen-gas-atmosphere mind for 3 hours. After having cooled the solution to the room temperature, having added dichloromethane 100ml, dissolving the content and a ** exception's carrying out an insoluble matter, reduced pressure distilling off of the solvent of residue was carried out. About the obtained reaction mixture, silica gel column chromatography (developing solvent: hexane / toluene =1/1 (vol/vol)) refined, and object compound (19) 1.96g (89% of yield) was obtained as a straw color crystal.

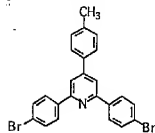
[0096] The fusing point of the obtained compound was 167-169 degrees C. Moreover, the following results were obtained when the molecular formula was analyzed. In addition, analysis

of the molecular formula was conducted using CHN analysis equipment. The same may be said of the following synthetic examples.

Molecular formula: C₅₂H₄₅N₃ Calculated value (%) C:87.73% H:6.37% N:5.90% Analytical value (%) C:87.61% H:6.40% N:5.99% [0097] Synthetic example 2 (synthesis of a compound (76))

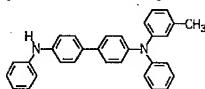
The following bromo-ized triphenyl pyridine derivative obtained by the same operation as a work example 1 by the 100ml three neck flask;

[Chemical formula 58]



1.0g (0.0021mol), the following benzidine derivative;

[Chemical formula 59]



1.8g (0.0043mol), sodium t-butoxide 0.5g (0.0051mol), After putting in acetic acid palladium 0.026g (0.00012mol) and tree t-butyl phosphine 0.09g (0.00046mol) and adding 5ml of O-xylene to this as a solvent, it agitated at 120 degrees C under nitrogen-gas-atmosphere mind for 3 hours. After having cooled the solution to the room temperature, having added dichloromethane 100ml, dissolving the content and a ** exception's carrying out an insoluble matter, reduced pressure distilling off of the solvent of residue was carried out. About the obtained reaction mixture, silica gel column chromatography (developing solvent: hexane / toluene =1/1 (vol/vol)) refined, and object compound (76) 2.2g (90% of yield) was obtained as a straw color crystal.

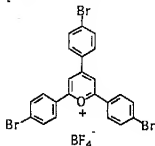
[0098] The fusing point of the obtained compound was 187-189 degrees C. Moreover, the following results were obtained when the molecular formula was analyzed.

Molecular formula: C₈₆H₆₇N₅ Calculated value (%) C:88.25% H:5.77% N:5.98% Analytical value (%) C:88.21% H:5.80% N:5.99% [0099] Synthetic example 3 (synthesis of a compound (38))

p-bromo benzaldehyde 15.0g (0.081mol) and 4'-bromo acetophenone 32.3g (0.16mol) are put in, toluene 50ml was added to this and the 200ml three neck flask which formed the water-

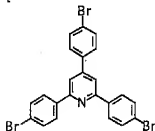
cooled condenser tube was dissolved in it. Next, 34.5g (0.24mol) of boron trifluoride-diethylether complexes are dissolved in toluene 15ml, and after adding agitating this solution among a room temperature, heating channeling back was carried out for 8 hours. Reaction liquid was cooled to the room temperature, it filtered, reduced pressure drying of the crystal which added 1 and 4-dioxane 400ml and deposited was carried out to this, and the following pyrylium salt and 28.2g (55% of yield) were obtained as a yellow crystal.

[Chemical formula 60]



[0100] Next, 20.0g (0.032mol) of the above-mentioned pyrylium salt is put in, tetrahydrofuran 150ml was added to this and the 2000ml three neck flask was dissolved in it. Furthermore, after adding 400ml of aqueous ammonia 14%, it agitated at 50 degrees C for 1 hour. Recrystallization treatment of the crystal obtained in the product by carrying out reduced pressure distilling off of the solvent after extraction by dichloromethane was carried out with the mixed solvent of dichloromethane/hexane, and the following bromo-ized triphenyl pyridine derivative and 9.9g (58% of yield) were obtained as a reddish brown crystal.

[Chemical formula 61]

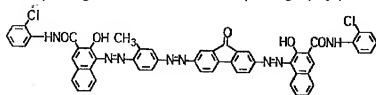


[0101] To a 100ml three neck flask, then, 1.8g (0.003mol) of the above-mentioned bromo-ized triphenyl pyridine derivatives, p and p'-JITORIRU amine 2.2g (0.011mol), sodium t-butoxide 1.3g (0.013mol), After putting in acetic acid palladium 0.06g (0.00017mol) and tree t-butyl phosphine 0.23g (0.0011mol) and adding 10ml of O-xylene to this as a solvent, it agitated at 120 degrees C under nitrogen-gas-atmosphere mind for 3 hours. After having cooled the solution to the room temperature, having added dichloromethane 100ml, dissolving the content and a ** exception's carrying out an insoluble matter, reduced pressure distilling off of the solvent of residue was carried out. About the obtained reaction mixture, silica gel column chromatography (developing solvent: hexane / toluene = 1/1 (vol/vol)) refined, and object

compound (38) 2.7g (91% of yield) was obtained as a straw color crystal.

[0102] The fusing point of the obtained compound was 315-317 degrees C. Moreover, the following results were obtained when the molecular formula was analyzed.

Molecular formula: C₆₅H₅₆N₄ Calculated value (%) C:87.41% H:6.32% N:6.27% Analytical value (%) C:87.47% H:6.28% N:6.25% [0103] Trisazo compound [Chemical formula 62] expressed with the application work-example 1 following constitutional formula to the charge transporting material of an electrophotography photo conductor

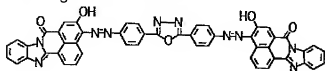


0.45 copy and 0.45 copy of polyester resin (Byron 200; made by Toyobo Co., Ltd.) were distributed by the sand mill with 50 copies of cyclohexanone. This was dried, after applying the dispersed matter of the obtained trisazo compound by a dip painting cloth method on the aluminum drum of 80 phi so that desiccation thickness may become 0.3g/m². [thus, the solution which dissolved amino compound (2) 50 copy and 50 copies of polycarbonate resin (pan-light K-1300; made in Teijin Chemicals) in 400 copies of 1 and 4-dioxanes on the obtained charge generating layer] Applied so that desiccation thickness might be set to 20 micrometers, and it was made to dry, and the charge transport layer was formed. Thus, the electrophotography photo conductor which has the photosensitive layer which consists of two-layer was obtained.

[0104] In this way, the electrophotography copying machine (Minolta Co., Ltd. make; EP-540) of marketing of the obtained photo conductor is used. - Attenuation factor DDR of initial electric potential when neglecting it all over dark place for light exposure [which was required in order to carry out corona electrical charging at 6kV and to set the initial surface potential V₀ (V) and initial electric potential to one half] E₁ / 2 (lux-sec) or 1 second 1 (%) was measured.

The photo conductor which used an amino compound (4), (5), and (8) instead of the amino compound (2) used in the work example 1 with the same method as two to work-example 4 work example 1 and the same composition was produced. In this way, about the obtained photo conductor, V₀, E₁/2, and DDR1 were measured by the same method as a work example 1.

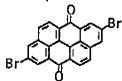
[0105] Screw azo compound [Chemical formula 63] expressed with the work-example 5 following constitutional formula



0.45 copy and 0.45 copy of polystyrene resin (molecular weight 40,000) were distributed by the sand mill with 50 copies of cyclohexanone. This was dried, after applying the dispersed matter of the obtained screw azo compound by a dip painting cloth method on the aluminum drum of 80 phi so that desiccation thickness may become 0.3g/m². Thus, the solution which dissolved amino compound (13) 50 copy and 50 copies of polyarylate resin (U-100; made by Unitika, Ltd.) in 400 copies of 1 and 4-dioxanes on the obtained charge generating layer was applied so that desiccation thickness might be set to 25 micrometers, and it was dried, and the charge transport layer was formed. Thus, the electrophotography photo conductor which has the photosensitive layer which consists of two-layer was obtained.

[0106] The photo conductor which used an amino compound (15), (16), and (19) instead of the amino compound (13) used in the work example 5 with the same method as six to work-example 8 work example 5 and the same composition was produced. In this way, about the obtained photo conductor, V0, E1/2, and DDR1 were measured by the same method as a work example 1.

[0107] Polycyclic quinone system pigment [Chemical formula 64] expressed with the work-example 9 following constitutional formula



0.45 copy and 0.45 copy of polycarbonate resin (pan-light K-13000: made in Teijin Chemicals) are distributed by a sand mill with 50 copies of dichloroethane. It was made to dry, after applying the dispersed matter of the obtained polycyclic quinone system pigment on the aluminum drum of 80 phi so that desiccation thickness may become 0.4g/m². Thus, applied so that the solution desiccation thickness which dissolved amino compound (25) 60 copy and 50 copies of polyarylate resin (U-100: made by Unitika, Ltd.) in 400 copies of 1 and 4-dioxanes on the obtained charge generating layer might be set to 18 micrometers, and it was made to dry, and the charge transport layer was formed. Thus, the electrophotography photo conductor which has the photosensitive layer which consists of two-layer was produced.

[0108] The photo conductor which uses an amino compound (27) and (31) respectively was produced instead of the amino compound (25) used in the thing of the same composition, however the work example 9 by the same method as ten to work-example 11 work example 9. In this way, about the obtained photo conductor, V0, E1/2, and DDR1 were measured by the same method as a work example 1.

[0109] 0.45 copy of work-example 12 titanylphthalocyanine and 0.45 copy of butyral resin (BX-1: made by Sekisui Chemical Co., Ltd.) are distributed by a sand mill with 50 copies of dichloroethane. It was made to dry, after applying the dispersed matter of the obtained

phthalocyanine pigment on the aluminum drum of 80 phi so that desiccation thickness may be set to 0.3 micrometer. Thus, on the obtained charge generating layer, the amino compound (35) 50 copy and the solution which dissolved 50 copies of polycarbonate resin (PC-Z: made by Mitsubishi Gas Chemical Co., Inc.) in 400 copies of 1 and 4-dioxanes were applied so that desiccation thickness might be set to 18 micrometers, and it was dried, and the charge transport layer was formed. Thus, the electrophotography photo conductor which has the photosensitive layer which consists of two-layer was produced. In this way, about the obtained photo conductor, V0, E1/2, and DDR1 were measured by the same method as a work example 1.

[0110] It is made to dissolve, agitating enough 50 copies of work-example 13 copper phthalocyanine, and 0.2 copy of tetra-nitroglycerine copper phthalocyanine to 500 copies of concentrated sulfuric acid 98%. After opening this in 5000 copies of water and depositing the photoconductivity material composition thing of copper phthalocyanine and tetra-nitroglycerine copper phthalocyanine, it filtered and washed and dried at 120 degrees C under the reduced pressure. Ten copies of obtained photoconductivity constituents In this way, 22.5 copies of thermosetting acrylics (AKURIDEYUKU A405: made in great Japan, Inc.), 7.5 copies of melamine resins (super BEKKAMIN J820: made in great Japan, Inc.), Amino compound (43) 15 copies are put into a ball mill pot with 100 copies of partially aromatic solvents which mixed an equivalent amount of MECHIME ethyl ketone and xylene, it distributes for 48 hours, photosensitive coating liquid is prepared, spray spreading of this coating liquid is carried out on the aluminum drum of 80 phi, it dried and about 15-micrometer photosensitive layer was made to form. Thus, the lamina type photo conductor was produced. In this way, about the obtained photo conductor, the same method as a work example 1, however corona electrical charging were performed at +6kV, and V0, E1/2, and DDR1 were measured.

[0111] The photo conductor which uses an amino compound (45) and (48) respectively instead of the amino compound (43) used in the thing of the same composition, however the work example 13 by the same method as 14 to work-example 15 work example 13 was produced. In this way, about the obtained photo conductor, V0, E1/2, and DDR1 were measured by the same method as a work example 13. The measurement result of V0 of the photo conductor obtained in the work examples 1-15, E1/2, and DDR1 is collectively shown in Table 1.

[0112]

[Table 1]

	V_o (V)	$E_{1/2}$ (Lux·sec)	DDR ₁ (%)
実施例 1	-660	1.0	2.6
実施例 2	-660	1.0	2.9
実施例 3	-650	0.9	2.8
実施例 4	-660	1.0	3.0
実施例 5	-660	0.8	2.7
実施例 6	-660	0.9	3.0
実施例 7	-670	0.9	3.2
実施例 8	-650	0.7	2.9
実施例 9	-660	1.0	3.4
実施例 10	-660	0.7	2.8
実施例 11	-650	0.8	2.9
実施例 12	-660	1.0	3.3
実施例 13	+660	0.9	2.7
実施例 14	+660	0.9	3.0
実施例 15	+650	0.8	2.9

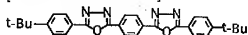
[0113] As shown in Table 1, there are photo conductors of enough of this example, and its charge maintenance ability is small to the grade whose rate of a dark decay is also sufficiently usable as a photo conductor, and excellent in it also in sensitivity with the laminated type or the lamina type. Furthermore, although the repetition on-the-spot photo test at the time of right electrification by a commercial electrophotography copying machine (Minolta Co., Ltd. make; EP-350Z) was done in the photo conductor of a work example 13, even if it performed 1000 copies, in the first stage and a final image, story tonality is excellent, there is no sensitivity change, and the clear picture was obtained. This shows that repetition characteristics of the photo conductor of this invention are also stable.

[0114] On the substrate of the application work-example 16 indium stannic acid ghost covering glass to an organic electroluminescence element, the 50-nm-thick thin film was formed for the amino compound (15) by vacuum evaporation as an organic hole injection transportation layer. Next, as an organic luminous layer, the thin film was formed so that it might become a thickness of 50nm by vacuum evaporation about aluminium tris oxine. Furthermore, as a cathode, the thin film was formed so that it might become a thickness of 200nm by vacuum evaporation about magnesium. The organic electroluminescence element was produced as mentioned above.

[0115] In 17 to work-example 19 work example 16, the organic electroluminescence element was produced completely like the work example 16 except replacing with an amino compound (16), (19), and (26) instead of using an amino compound (15).

[0116] The thin film was formed so that it might become a thickness of 70nm by vacuum evaporation about an amino compound (31) as an organic hole injection transportation layer on the substrate of work-example 20 indium stannic acid ghost covering glass. Next, the thin film was formed so that it might become a thickness of 100nm about aluminium tris oxine as an organic luminous layer. Next, the following oxadiazole compound as an organic electron injection transportation layer;

[Chemical formula 65]

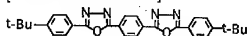


The thin film was formed so that it might become a thickness of 50nm by vacuum evaporation. Furthermore, as a cathode, the thin film was formed so that it might become a thickness of 200nm by vacuum evaporation about magnesium. The organic electroluminescence element was produced as mentioned above.

[0117] In 21 to work-example 23 work example 20, the organic electroluminescence element was produced completely like the work example 20 except using an amino compound (38), (44), and (50) instead of using a compound (31).

[0118] On the substrate of work-example 24 indium stannic acid ghost covering glass, the thin film was formed for the amino compound (55) by a thickness of 50nm by vacuum evaporation as an organic luminous layer. Next, the following oxadiazole compound as an organic electron injection transportation layer;

[Chemical formula 66]



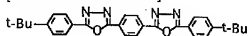
The thin film was formed so that it might become a thickness of 20nm by vacuum evaporation. Furthermore, the thin film was formed so that Mg and Ag might be set to 20nm by vacuum evaporation by the atomic ratio of 10:1 as a cathode. The organic electroluminescence element was produced as mentioned above.

[0119] On the work-example 25 indium stannic acid ghost covering glass substrate, the vacuum deposition of the compound (61) was carried out, and the hole injection layer of 20nm of thickness was formed. Next, the vacuum deposition of N and N'-diphenyl N, N'-(3-methylphenyl)-1, and the 1'-biphenyl 4 and 4'-diamine was carried out, and the positive hole transportation layer of 40nm of thickness was formed. Next, the thin film was formed so that it might become a thickness of 50nm by vacuum evaporation about a tris (8-hydroxyquinoline) aluminium complex. Furthermore, the thin film was formed so that it might become a thickness of 200nm by vacuum evaporation about Mg and Ag by the atomic ratio of 10:1 as a cathode. The organic electroluminescence element was produced as mentioned above.

[0120] On the work-example 26 indium stannic acid-ized covering glass substrate, the vacuum deposition of N and N'-diphenyl N, N'-(3-methylphenyl)-1, and the 1'-biphenyl 4 and 4'-diamine was carried out, and the hole injection transportation layer of 60nm of thickness was formed. Next, the luminous layer was formed so that it might become a thickness of 60nm with vacuum deposition at a rate of 3:1 about a tris (8-hydroxy KIRIN) aluminium complex and an amino compound (63). Furthermore, the thin film was formed so that it might become a thickness of 200nm by vacuum evaporatio about Mg and Ag by the atomic ratio of 10:1 as a cathode. The organic electroluminescence element was produced as mentioned above.

[0121] Dichloromethane was made to dissolve a compound (67) on a work-example 27 indium stannic acid ghost covering glass substrate, and the hole injection transportation layer of 50nm of thickness was obtained by spin coating. Furthermore, the following oxadiazole compound after forming a luminous layer so that it may become a thickness of 20nm by vacuum evaporatio about a tris (8-hydroxyquinoline) aluminium complex;

[Chemical formula 67]



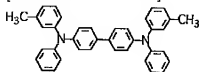
The electron injection transportation layer of 20nm of thickness was formed by vacuum evaporatio. Furthermore, the thin film was formed so that it might become a thickness of 200nm by vacuum evaporatio about Mg and Ag by the atomic ratio of 10:1 as a cathode. The organic electroluminescence element was produced as mentioned above.

[0122] In 28 to work-example 29 work example 27, the organic electroluminescence element was produced completely like the work example 27 except using an amino compound (69) and (73) instead of using a compound (67).

[0123] On a work-example 30 indium stannic acid ghost covering glass substrate, a compound (77), A tris (8-hydroxyquinoline) aluminium complex and polymethylmethacrylate were dissolved in tetrahydrofuran at the rate of a bulk density of 3:2:5, and the luminous layer of 100nm of thickness was formed by the spin coating method. next -- as a cathode -- the atomic ratio of 10:1 -- Mg and Ag -- vacuum evaporatio -- 200nm -- thickness -- the thin film was formed like. The organic electroluminescence element was produced as mentioned above.

[0124] It is the following amino compound as an organic hole injection transportation layer on a comparative example 1 indium stannic acid ghost covering glass substrate.;

[Chemical formula 68]



The 50-nm-thick thin film was formed with vacuum deposition. Next, as an organic luminous

layer, the thin film was formed so that aluminium tris oxine might be set to 50nm in thickness with vacuum deposition. The organic electroluminescence element was produced as mentioned above.

[0125] The luminescence starting voltage when applying direct current voltage by using the glass electrode as an anode about the organic electroluminescence element obtained by the evaluation work examples 16-30 and a comparative example 1, and the highest luminescent brightness and the luminescence starting voltage at that time were measured. A measurement result is collectively shown in Table 2.

[0126]

[Table 2]

	発光開始電圧 (V)	発光最高輝度 (cd/m ²)	最高発光輝度に おける電圧(V)
実施例16	3.5	16,000	11.7
実施例17	4.0	15,800	12.1
実施例18	3.2	16,500	12.0
実施例19	3.6	14,300	11.9
実施例20	3.4	15,700	12.2
実施例21	3.5	18,200	12.0
実施例22	3.5	15,600	12.5
実施例23	3.0	16,900	12.3
実施例24	3.5	14,600	12.0
実施例25	3.5	15,100	12.2
実施例26	3.6	18,300	12.0
実施例27	3.0	14,600	11.9
実施例28	3.2	17,800	12.0
実施例29	3.5	16,200	12.1
実施例30	3.5	15,400	12.5
比較例1	4.5	8,700	12.1

[0127] As shown in Table 2, the organic electroluminescence element of this invention showed high luminescent brightness also by undervoltage. Moreover, about the organic electroluminescence element of the work example 21 of this invention, when carrying out continuation luminescence by current density 1 mA/cm², luminescence stable for 1000 hours or more was able to be observed. the organic electroluminescence element of this invention is not limited to element composition material, such as the luminescent material used for improvement in luminous efficiency and luminescent brightness, and the reinforcement of an element being ***** and combining, a luminescence auxiliary material, a charge transporting

material, a sensitizer, resin, and an electrode material, and the element production methods.
[0128]

[Effect of the Invention] This invention offers the new amino compound which has the charge transport capability to have excelled. By using this amino compound, sensitivity, charge transport characteristics, initial surface potential, It excels in initial electrophotographic properties, such as a rate of a dark decay, and the fatigue to repetition use can also obtain the organic electroluminescence element excellent in endurance with few electrophotography photo conductors and large luminescence intensity, and low luminescence starting voltage.

[Brief Description of the Drawings]

[Drawing 1] The outline sectional view of the example of 1 composition of an organic electroluminescence element.

[Drawing 2] The outline sectional view of the example of 1 composition of an organic electroluminescence element.

[Drawing 3] The outline sectional view of the example of 1 composition of an organic electroluminescence element.

[Drawing 4] The outline sectional view of the example of 1 composition of an organic electroluminescence element.

[Explanations of letters or numerals]

1: Anode 2: Hole injection transportation layer

3: Organic luminous layer 4: Cathode

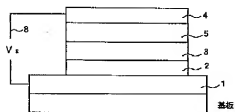
5: Electron injection transportation layer 6: Organic luminescent material

7: Charge transporting material 8: Lead wire

[Drawing 1]



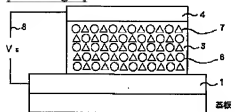
[Drawing 2]



[Drawing 3]



[Drawing 4]



[Translation done.]